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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/028,145	12/20/2001	Ching-Pang Lee	13DV14114	2460

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EXAMINER

VERDIER, CHRISTOPHER M

ART UNIT	PAPER NUMBER
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3745

DATE MAILED: 12/24/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/028,145

Applicant(s)

LEE ET AL.

Examiner

Christopher Verdier

Art Unit

3745

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3, 6-9 and 12 is/are rejected.
- 7) ☒ Claim(s) 4, 5, 10 and 11 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 December 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

### Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: .

### *Drawings*

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: "A" (page 8, last paragraph). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

### *Specification*

The abstract of the disclosure is objected to because it contains the phrase "The present invention provides" (line 3) which is implied and should be deleted. Correction is required. See MPEP § 608.01(b).

### *Claim Objections*

Claims 1-12 are objected to because of the following informalities: Appropriate correction is required.

In claim 1, line 6, -- the -- should be inserted after "with".

In claim 1, line 7, -- at least one -- should be inserted after "said" (first occurrence).

In claim 3, line 2, -- at least one -- should be inserted after "said" (first occurrence).

In claim 7, line 11, -- at least one -- should be inserted after "said" (last occurrence).

In claim 9, line 2, -- at least one -- should be inserted after "said" (first occurrence).

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1 and 7 are rejected under 35 U.S.C. 102(b) as being anticipated by Andersen 4,142,824. Note the airfoil 20 having root 16, tip near 46, leading edge 26, trailing edge 28, first wall 44 extending from the leading edge to the trailing edge, second wall 42 extending from the leading edge to the trailing edge, with the second wall 42 having ribs 55 extending therefrom, and outer wall 58 disposed in spaced apart relationship with the second wall 42 and attached to the ribs 55, with the outer wall comprising a high temperature foil. The outer wall is considered to be spaced apart from the second wall interior periphery, due to the presence of slots 54. The outer wall is a high temperature foil because it is inherently capable of withstanding high temperatures that occur in a gas turbine engine. Note suction side tip wall 42 and pressure side tip wall 44. The pressure side tip wall 44 is offset from the pressure side wall 24 to define a tip shelf near 56 extending circumferentially and having at least one rib 55 extending therefrom. The outer tip wall 58 is disposed on the pressure side of the tip in spaced apart relation with the pressure side tip wall 44.

Claim 1 is also rejected under 35 U.S.C. 102(b) as being anticipated by Japanese Patent 1-53002 (figures 1a-1c). Note the airfoil 1 which inherently has a root and a tip, a leading edge to the left in figure 1c, a trailing edge to the right in figure 1c, a first lower wall in figure 1c

Art Unit: 3745

extending from the leading edge to the trailing edge, a second upper wall in figure 1c extending from the leading edge to the trailing edge, with the second wall having unnumbered ribs extending therefrom, and outer wall 3 disposed in spaced apart relationship with the second wall and attached to the ribs, with the outer wall comprising a high temperature foil. The outer wall is considered to be spaced apart from the second wall interior periphery, due to the presence of slots 2. The outer wall is a high temperature foil because it is inherently capable of withstanding high temperatures that occur in a gas turbine engine.

Claims 1 and 6 are rejected under 35 U.S.C. 102(b) as being anticipated by Jackson 5,626,462 (figures 1 and 5). Note the airfoil 100/40 which has an unnumbered root and a tip, a leading edge to the left in figure 5, a trailing edge to the right in figure 5, a first lower wall near 50 in figure 5 extending from the leading edge to the trailing edge, a second upper wall near 48 in figure 5 extending from the leading edge to the trailing edge, with the second wall having ribs near 48 extending therefrom, and outer wall 42 disposed in spaced apart relationship with the second wall and attached to the ribs, with the outer wall comprising a high temperature foil. The outer wall is considered to be spaced apart from the second wall interior periphery, due to the presence of slots 46. The outer wall is a high temperature foil because it is inherently capable of withstanding high temperatures that occur in a gas turbine engine. The outer wall high temperature foil is made of a nickel-base alloy (column 8, lines 9-24).

Art Unit: 3745

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 2-3 and 8-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Andersen 4,142,824 in view of Chandley 3,423,069. Andersen discloses an airfoil substantially as claimed as set forth above, including a high temperature foil 58 located in spaced apart relationship with the second wall 42 and attached to the ribs 55, having an interface layer in the form of brazing material disposed between the ribs 55 and the high temperature foil outer wall 58, but does not disclose that the high temperature foil comprises a rhodium-based alloy.

Art Unit: 3745

Chandley (figure 2) shows an airfoil 10 for a high temperature gas turbine engine having a shield 28 made of platinum/rhodium alloy, for the purpose of protecting the airfoil by virtue of the platinum/rhodium alloy preventing melting of the leading edge region.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to form the airfoil of Andersen such that the high temperature foil is of platinum/rhodium alloy, as taught by Chandley, for the purpose of protecting the airfoil by virtue of the platinum/rhodium alloy preventing melting of the airfoil. Although Chandley discloses that the platinum/rhodium alloy shield 28 extends along the leading edge portion, one of ordinary skill in the art would have recognized from the teachings of Chandley that the platinum/rhodium alloy shield is applicable to any portion of the airfoil, including the entirety of the tip periphery.

Claim 2 is also rejected under 35 U.S.C. 103(a) as being unpatentable over Japanese Patent 1-53002 in view of Chandley 3,423,069. Japanese Patent 1-53002 discloses an airfoil substantially as claimed as set forth above, including a high temperature foil 3 located in spaced apart relationship with the second wall and attached to the ribs, but does not disclose that the high temperature foil comprises a rhodium-based alloy.

Chandley (figure 2) shows an airfoil 10 for a high temperature gas turbine engine having a shield 28 made of platinum/rhodium alloy, for the purpose of protecting the airfoil by virtue of the platinum/rhodium alloy preventing melting of the leading edge region.

Art Unit: 3745

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to form the airfoil of Japanese Patent 1-53002 such that the high temperature foil is of platinum/rhodium alloy, as taught by Chandley, for the purpose of protecting the airfoil by virtue of the platinum/rhodium alloy preventing melting of the airfoil. Although Chandley discloses that the platinum/rhodium alloy shield 28 extends along the leading edge portion, one of ordinary skill in the art would have recognized from the teachings of Chandley that the platinum/rhodium alloy shield is applicable to any portion of the airfoil, including the entirety of the tip periphery.

Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Japanese Patent 1-53002 and Chandley 3,423,069 as applied to claim 2 above, and further in view of Andersen 4,142,824. The modified airfoil of Japanese Patent 1-53002 shows all of the claimed subject matter except for an interface layer between the rib and the outer wall 3.

Andersen 4,142,824 shows an airfoil having a high temperature foil 58 located in spaced apart relationship with a second wall 42 and attached to ribs 55, having an interface layer in the form of brazing material disposed between the ribs 55 and the high temperature foil outer wall 58, for the purpose of positively attaching the high temperature foil to the ribs by brazing.

It would have been further obvious at the time the invention was made to a person having ordinary skill in the art to form the modified airfoil of Japanese Patent 1-53002 such that there is an interface layer between the rib and the outer wall 3, in the form of brazing material, as taught



Art Unit: 3745

by Andersen, for the purpose of positively attaching the high temperature foil to the ribs by brazing.

Claim 6 is also rejected under 35 U.S.C. 103(a) as being unpatentable over either (Andersen 4,142,824 or Japanese Patent 1-53002) in view of Craig 4,501,053. Andersen 4,142,824 and Japanese Patent 1-53002 disclose airfoils substantially as claimed as set forth above including respective outer walls 58, 3 in the form of high temperature foils, but do not disclose that the high temperature foil comprises a nickel-based alloy.

Craig 4,501,053 (figures 3 and 5) shows a turbine blade having a shell 34 in the form of a nickel-base alloy (see column 6, lines 5-17), for the purpose of providing the turbine blade with good resistance to corrosion.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to form the high temperature foils of either Andersen or Japanese Patent 1-53002 of a nickel-base alloy, as taught by Craig, for the purpose of providing good resistance to corrosion.

Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Andersen 4,142,824 in view of Craig 4,501,053. Andersen 4,142,824 discloses an airfoil substantially as claimed as set forth above including an outer walls 58 in the form of a high temperature foil, but do not disclose that the high temperature foil comprises a nickel-based alloy.

Craig 4,501,053 (figures 3 and 5) shows a turbine blade having a shell 34 in the form of a nickel-base alloy (see column 6, lines 5-17), for the purpose of providing the turbine blade with good resistance to corrosion.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to form the high temperature foil of Andersen of a nickel-base alloy, as taught by Craig, for the purpose of providing good resistance to corrosion.

***Prior Art***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Correia and Lee 5,733,102, and Kercher, and Lee 2002/0187044 are cited to show airfoil tips with shelves.

Lieland is cited to show an airfoil tip with a thermal barrier coating.

***Allowable Subject Matter***

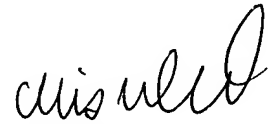
Claims 4-5 and 10-11 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Art Unit: 3745

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher Verdier whose telephone number is (703)-308-2638. The examiner can normally be reached on Monday-Friday from 10:00-6:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward K. Look can be reached on (703) 308-1044. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9302 for regular communications and (703) 872-9303 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0861.



Christopher Verdier  
Primary Examiner  
Art Unit 3745

C.V.  
December 16, 2002